Leader Instruments Corporation
6484 Commerce Drive, Cypress, CA 90630
Tel. No. 1-800-645-5104 or 714-527-9300 Fax

LCR-740

LCR BRIDGE

SERVICE MANUAL

****
[WARNING]
These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than that contained in the service manual unless you are qualified to do so.

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2nd edition Jul., 1987

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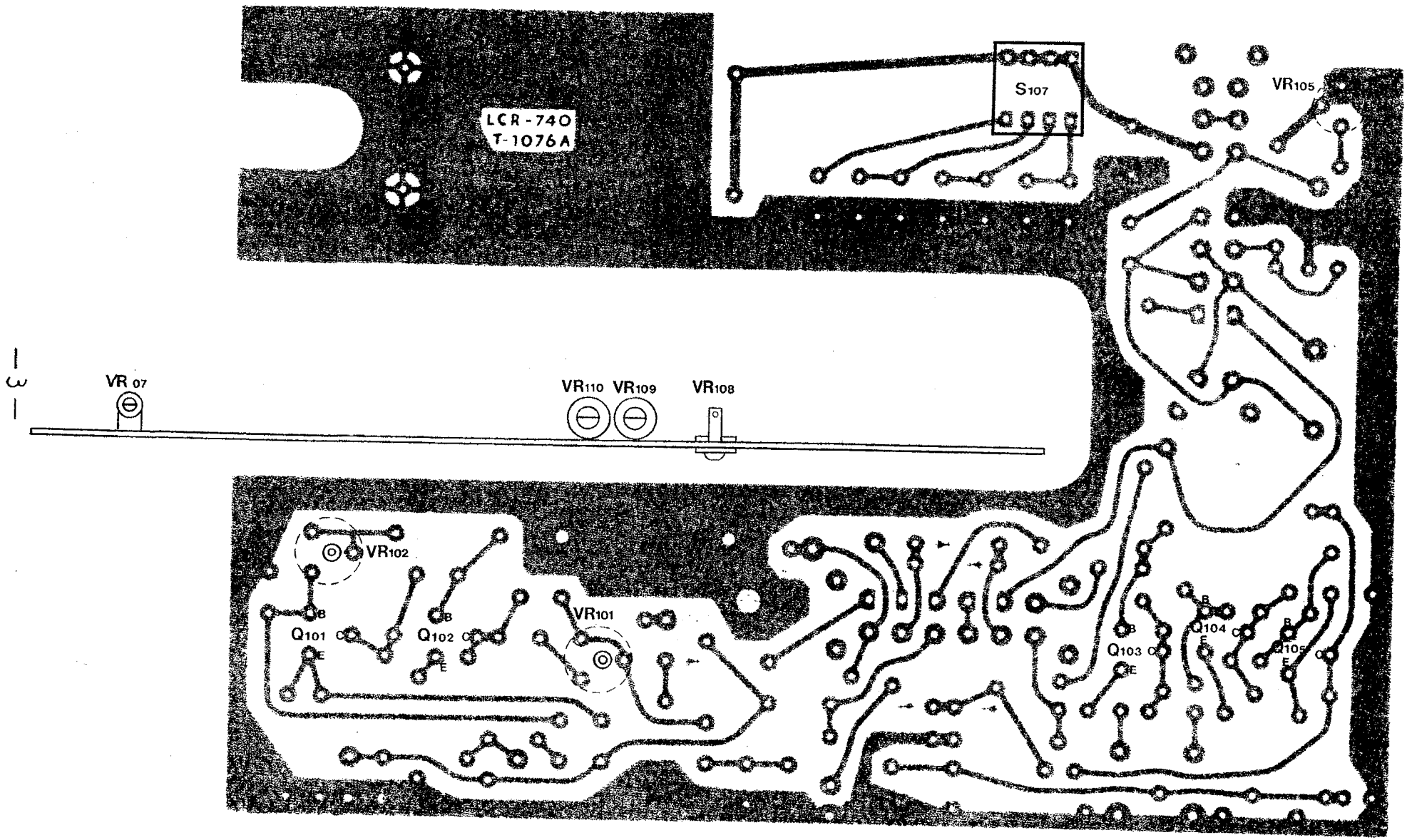
TEST EQUIPMENT REQUIRED

Description	Minimum Spec.
Voltmeter	DC: 0 ~ 10V
Standard Resistor	1Ω ±0.1% no inductance
	10Ω ±0.1% no inductance
	100Ω ±0.1% no inductance
	2KΩ±0.1% no inductance
	4KΩ±0.1% no inductance
	6KΩ±0.1% no inductance
	8KΩ±0.1% no inductance
Standard Capacitor	1μF ±0.3% (D < 0.1 If possible)
Standard Inductor	1mH ±0.3% (Q > 10 If possible)
Oscilloscope	LBO-507A
Frequency Counter	LDC-821

OUTLINE OF PROCEDURE

Proceed as directed in the following steps, when maintaining.

STEP		ADJUSTMENT	PAGE
1	BIAS ADJ.	VR 102	4
2	1KHz ADJ.	VR 101	4
3	1KΩ RANGE ADJ.	VR 105	5
4	+1.00 RANGE ADJ.	VR 107	5
5	0.1Ω RANGE ADJ.	VR 108	5 ~ 6
6	1Ω RANGE ADJ.	VR 109	6
7	10Ω RANGE ADJ.	VR 110	6 ~ 7
8	1μF RANGE ADJ.	S 107	7


LCR-740
T-1076A
S107
VR105
VR107
VR110
VR109
VR108
VR102
VR101
Q101
Q102
Q103
Q104
Q105

1. POWER SUPPLY

CHECK: V_{BB} is approximatly +9V.
V_B is approximatly +8V.

2. INTERNAL OSC

SET:	SELECTOR	R
	RANGE MULTIPLIER	0.1Ω
	SOUCE	AC
	R.C.L dial	0 . 0 0 (CCW.)
	Rx terminal	Short (Use brass wire more than 2ϕ, if possible.)
	SENSITIVITY knob	PWR ON
	EXT. SIG IN terminal (inside green line)	Connect to V-IN terminal of Oscilloscope.

a) CHECK: Voltage is between 0.8V and 1V at Q_{101-E}

ADJUST: BIAS ADJ. (VR102) to be between 0.8V and 1V at Q_{101-E}

b) CHECK: Frequency is 1KHz ±30Hz.

ADJUST: FREQ. ADJ. (VR101) for 1KHz ±30Hz.

c) CHECK: Output signal waveforms at 1KHz make reference to the waveform chart 5

ADJUST: BIAS ADJ. (VR102) so that distortion may slightly leave nearly at the top of the waveform.

d) Repeat the steps a through c).

3. 1KΩ RANGE FULL SCALE ADJ.

SET:	RANGE MULTIPLIER	1KΩ
	NORMAL ↔ +1.00	NORMAL
	R.C.L dial	0 . 0 0 (CW)
	Rx terminal	Connect to Standard Resistor of 10KΩ.
	PHONE terminal (inside hot line)	Disconnect oscilloscope from EXT. SIG IN terminal, and connect it.

The other setup is the same as above.

CHECK: No further reduction in meter indication can be obtained by controlling NULL SET VR105 in condition of sensitivity as high as possible.

ADJUST: NULL SET VR105 for no further reduction in meter indication in the same condition as above.

4. +1.00 RANGE SCALE ADJ.

SET:	NORMAL↔+1.00	+1.00
	R.C.L dial	9 . 0 0

The other setup is the same as above.

CHECK: Minimum meter indication can be obtained by controlling +1.00 RANGE NULL SET VR107 in condition of sensitivity as high as possible.

ADJUST: VR107 for minimum meter indication in the same condition as above.

5. 0.1Ω RANGE FULL SCALE ADJ.

SET:	RANGE MULTIPLIER	0.1Ω
	NORMAL ↔ +1.00	NORMAL
	R.C.L dial	0 . 0 0 (CW)
	R.C.L dial lock	lock
	Rx terminal	Connect to standard resistor of 1.00Ω

The other setup is the same as above.

CHECK: Minimum meter indication can be obtained by controlling 0.1Ω RANGE NULL SET VR108 in condition of sensitivity as high as possible.

ADJUST: VR108 for minimum meter indication in the same condition as above.

* NOTE: Tighten a screw with VR108 before checking this step and adjusting.

6. 1Ω RANGE FULL SCALE ADJ.

SET:	RANGE MULTIPLIER	1Ω
	Rx terminal	Connect to standard resistor of 10Ω.

The other setup is the same as above.

CHECK: Minimum meter indication can be obtained by controlling 1Ω RANGE NULL SET VR109 in condition of sensitivity as high as possible.

ADJUST: VR109 for minimum meter indication in the same condition as above.

7. 10Ω RANGE FULL SCALE ADJ.

SET:	RANGE MULTIPLIER	10Ω
	Rx terminal	Connect to standard resistor of 100Ω.

The other setup is the same as above.

CHECK: Minimum meter indication can be obtained by controlling 10Ω RANGE NULL SET VR110 in condition of sensitivity as high as possible.

ADJUST: VR110 for minimum meter indication in the same condition as above.

8. 1μF RANGE FULL SCALE ADJ.

SET:	SELECTOR	C
	RANGE MULTIPLIER	0.1μF
	D.Q range X1←→X10	X1
	D.Q dial	CCW.
	Cx terminal	Connect to standard capacitor of 1μF.

The other setup is the same as above.

CHECK: R.C.L dial reading is between 9.975 and 10.025μF, when minimum meter indication can be obtained by controlling R.C.L dial and D.Q dial.

ADJUST: R.C.L dial for minimum meter indication, while controlling D.Q dial and finding out proper combination of Cx Selector (S107).
R.C.L dial reading should be between 9.975 and 10.025μF, when finished adjusting.

9. STRAY CAPACITANCE CHECK

SET:	RANGE MULTIPLIER	100pF
	Cx terminal	Open

The other setup is the same as above.

CHECK: R.C.L dial reading is less than 4pF, when minimum meter indication can be obtained by controlling R.C.L dial and D.Q dial.

10. STRAY RESISTANCE CHECK

SET:	SELECTOR	R
	RANGE MULTIPLIER	0.1Ω
	Rx terminal	Short (Use brass wire more than 2 , if possible)

The other setup is the same as above.

CHECK: R.C.L dial reading should be less than 4mΩ, when minimum meter indication can be obtained by controlling R.C.L dial.

11. STRAY INDUCTANCE CHECK

SET:	SELECTOR	L
	RANGE MULTIPLIER	10μH
	Lx terminal	Short

The other setup is the same as above.

CHECK: R.C.L dial reading should be less than 0.4μH, when minimum meter indication can be obtained by controlling R.C.L dial and D.Q dial.

12. R.C.L DIAL LINEARITY CHECK

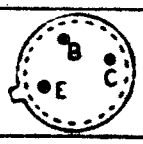
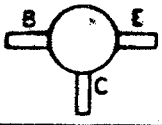
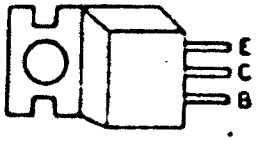
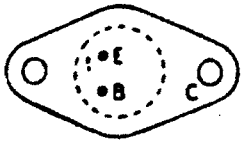
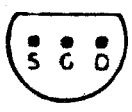
SET:	SELECTOR	R
	RANGE MULTIPLIER	1KΩ
	Rx terminal	8KΩ

CHECK: R.C.L dial reading should be between 7.99KΩ and 8.01KΩ, when minimum meter indication can be obtained by controlling R.C.L dial.

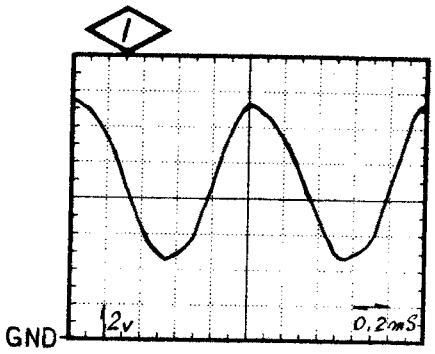
At each respective resistance, R.C.L dial reading should be within tolerances listed in Table as below.
Replace VR105 with a new one, if out of tolerance.

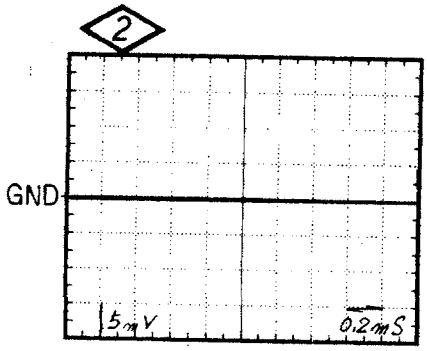
Rx	R.C.L dial reading		
10K	9.995	~	10.005KΩ
8K	7.99	~	8.01 KΩ
6K	5.99	~	6.01 KΩ
4K	3.99	~	4.01 KΩ
2K	1.99	~	2.01 KΩ

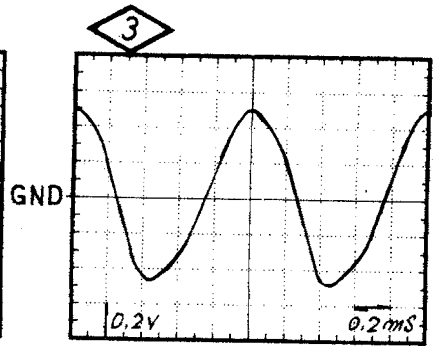
PIN CONNECTION, TRANSISTOR and CRT

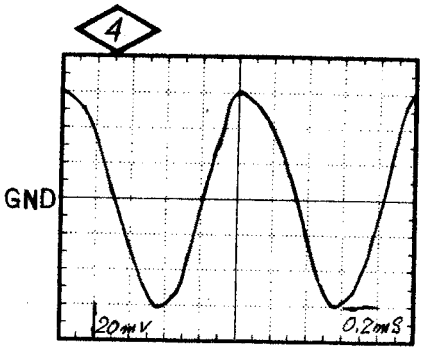
name	type	connection
2SA-495 2SA-561	PNP	
2SC-372 2SC-780A 2SC-373 2SC-387A 2SC-752	NPN	
2SA-628 2SA-725 2SA-726	PNP	
2SA-678	PNP	
S-A92	PNP	
2SA-497 2SA-711	PNP	
2SC-507 2SC-1012A 2SC-1216	NPN	
2N-3866		
2SC-288A	NPN	
2SC-641	NPN	
2SC-1279 2SC-1313 2SC-1215 2SC-1312	NPN	
2SC-1569 2SD-235 2SC-1625	NPN	
2SD-315	NPN	
2SK-30A	FET	

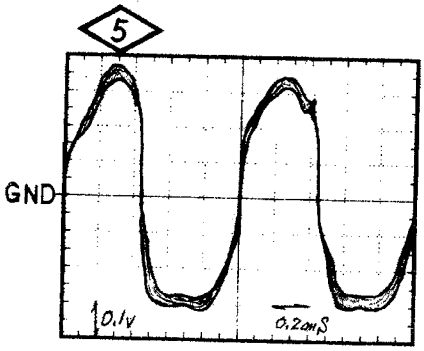
SET: SELECTOR : R
SOURCE : AC
NORMAL ↔ +1.00 : NORMAL
Rx : 8.2K
RCL dial : 8.19K (in the case of Rx = 8.2K)
RANGE MULTIPIER : 1K

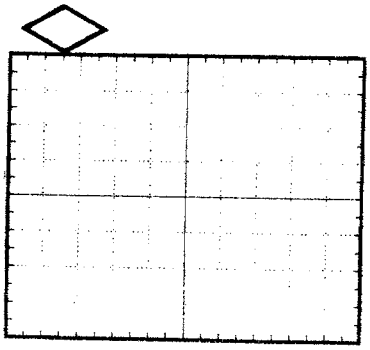


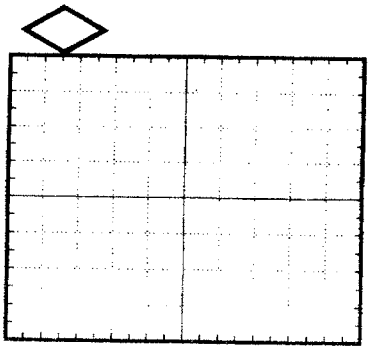


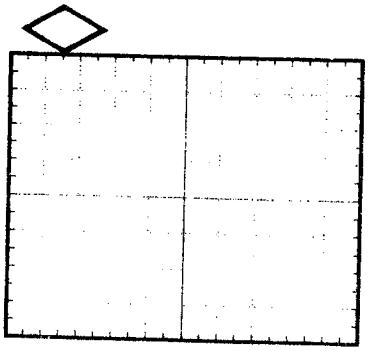


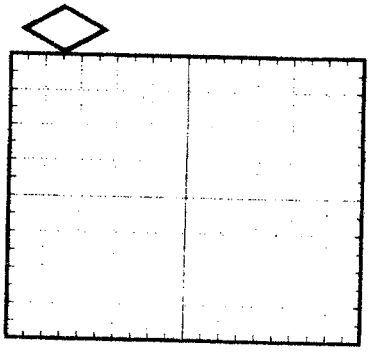


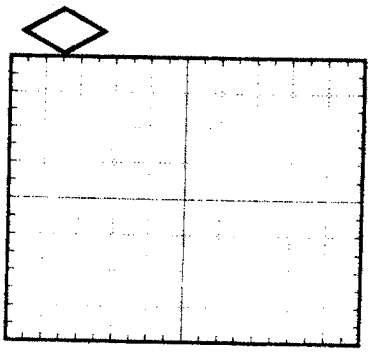


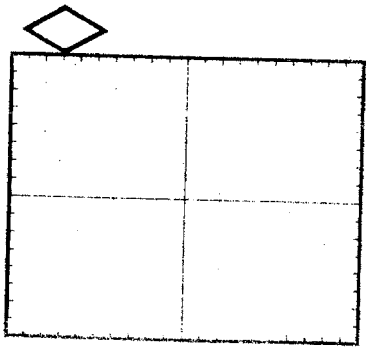


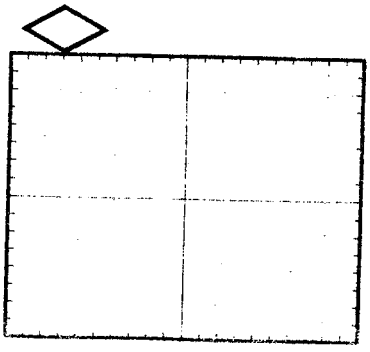


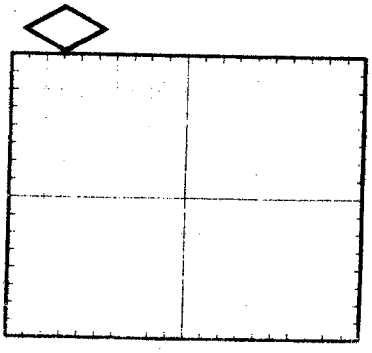


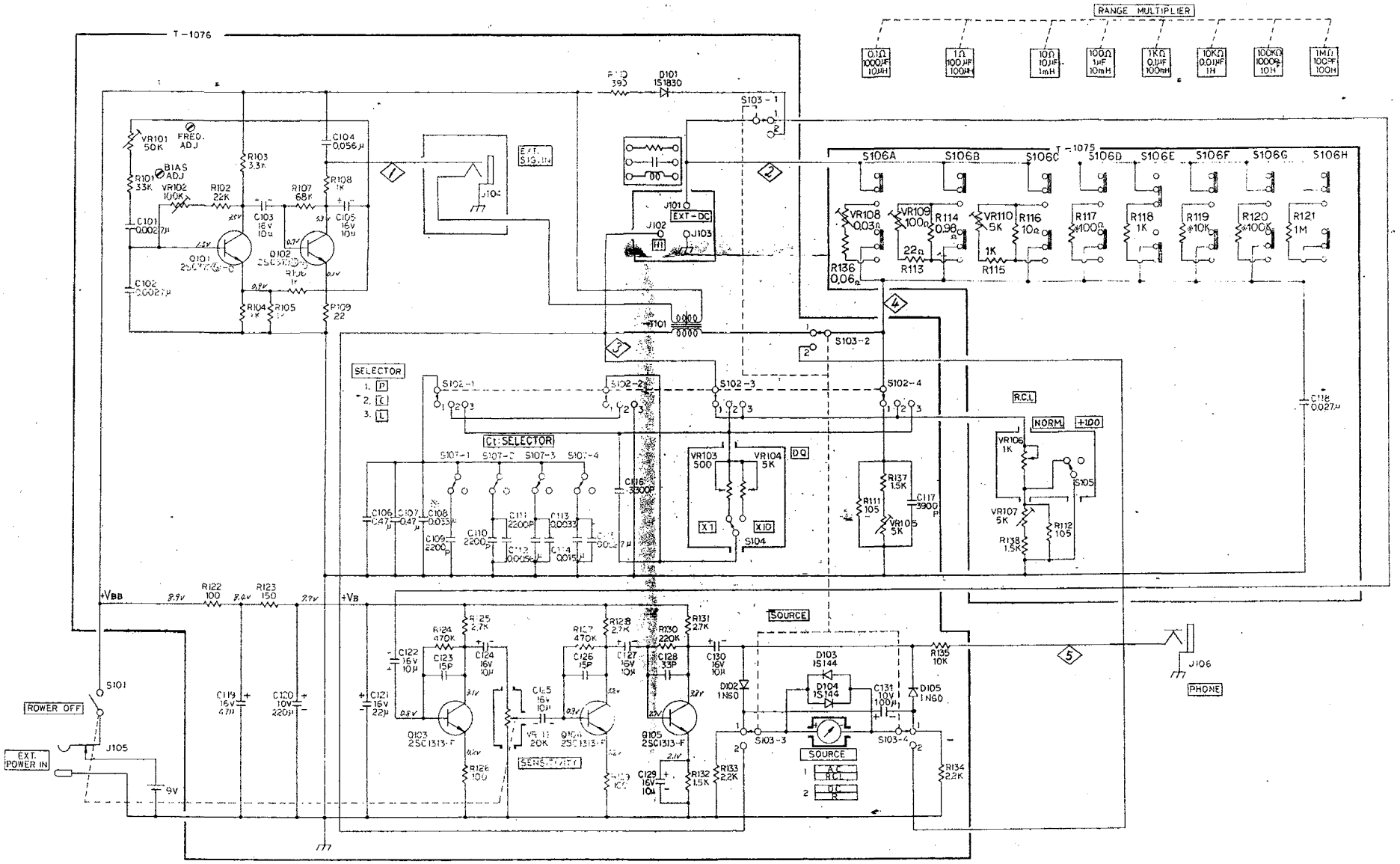












NOTE
- FRONT PANEL MARKING
- P.C.B
- NOT ON P.C.B

CAP. μ=μF, P=PF
RES. UNMARKED = OHMS, ¼W
※ FACTORY ADJ.

SCHEMATIC	Model LCR-740	D-8896
LCR BRIDGE		LEADER ELECTRONICS CORP.